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IS 7054 (1973): Specification for Casing for Bucket Elevators [MED 6: Continuous Bulk Conveying, Elevating, Hoisting Aerial Ropeways and Related Equipment]

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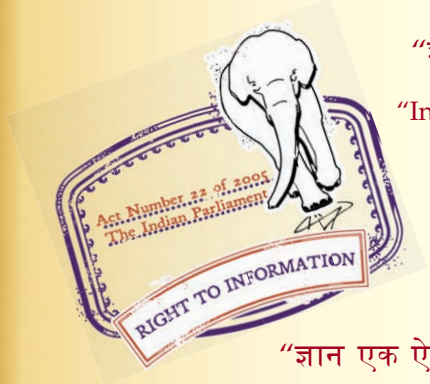

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS : 7054 - 1973
(Reaffirmed 2002)

Indian Standard

SPECIFICATION FOR CASING FOR BUCKET ELEVATORS

(First Reprint APRIL 1988)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 6

March 1974

Indian Standard

SPECIFICATION FOR CASING FOR BUCKET ELEVATORS

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*Shri N. V. Krishnamurthy was the Chairman for the meeting in which this standard was finalized.

(Continued on page 2)

(*Continued from page* 1)

Bucket Elevators Subcommittee, EDC 61 : 3

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Indian Standard

SPECIFICATION FOR CASING FOR BUCKET ELEVATORS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 October 1973, after the draft finalized by the Conveyors, Vertical Hoists and Bucket Elevators Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 This standard pertains to casing for :

a) centrifugal discharge bucket elevators,

b) positive discharge bucket elevators, and

c) continuous bucket elevators.

The buckets are mounted on chain or belt in case of centrifugal discharge and continuous bucket elevators, however, in case of positive discharge bucket elevators the buckets are mounted on chain.

0.3 While preparing the standard, assistance has been derived from the information received from the Fertilizer Corporation of India Ltd, Sindri.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard lays down the requirements of casing for vertical bucket elevators having buckets mounted on chain or belt. It specifies principal dimensions relating to different parts involved such as hood, head section, intermediate section, discharge spout and take up. This standard also deals with the general mechanical engineering requirements.

1.2 This standard does not cover the requirements for inclined bucket elevator casings and is not applicable to elevators handling material which does not behave as a solid.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 4240-1967† shall apply.

3. MATERIAL

3.1 The casing material shall be as such to suit the service conditions.

4. DIMENSIONS

4.1 The main dimensions for the casing for centrifugal discharge, positive discharge and continuous discharge bucket elevators having bucket mounted on chain or belt shall be as given in Tables 1 to 5 read with Fig. 1 to 3.

4.1.1 Recommended thickness for the sheets used in fabrication of the casing for bucket elevator shall be 2·00, 2·50, 3·15, 4·00, 5·00 and 6·3 mm. However, in case of lined casing, thickness of lining shall depend upon the material of the lining and the working condition. In case of mild steel sheets the minimum thickness of casing shall be 3·15 mm.

†Glossary of conveyor terms and definitions.

5. MANUFACTURE

5.1 The casing shall be either of (*a*) welded and bolted construction or (*b*) riveted or bolted construction. Intermediate section, boot section, head section, hood and discharge spout are bolted together to give full length of the bucket elevator. However, air vent shall be provided in the hood wherever necessary.

5.2 If required, casing may be lined with rubber, stainless steel or aluminium sheets.

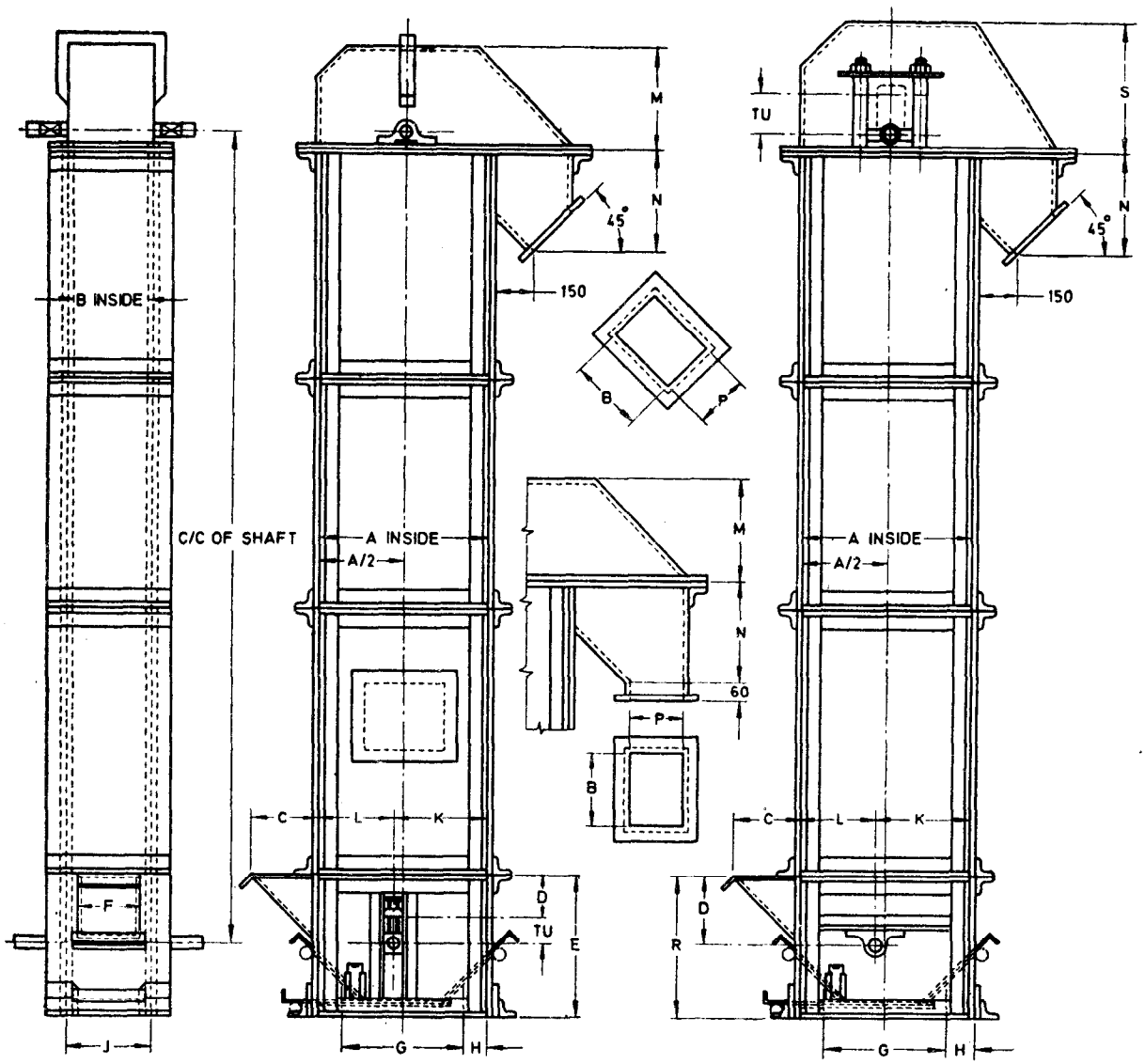
6. TAKE UP DEVICE

6.1 Take up device shall be provided for all bucket elevators. The take up may be at head shaft or boot shaft as desired by the purchaser depending upon the service conditions and layout of the plant.

6.2 Take up device at the head shaft shall be of screw type and take up at the boot shaft shall be either of screw type or of gravity type.

7. INSPECTION COVER

7.1 The casing for bucket elevator shall be provided with one or more inspection covers as desired by the purchaser. The location of the inspection cover shall be according to purchaser's requirement depending upon the layout of the plant.



All dimensions in millimetres.

FIG. 1 DIMENSIONS FOR CASING FOR CENTRIFUGAL DISCHARGE BUCKET ELEVATORS FOR BUCKETS ON CHAINS AND/OR ON BELTS

8. CLEAN OUT DOORS

8.1 The clean out doors at the boot section shall be provided to remove any material from the bottom of the elevator for maintenance or cleaning.

9. DESIGNATION

9.1 The casings shall be designated by the following:

a) Commonly used name,
b) Type of casing,
c) Nominal size, and
d) IS Number.

Example:

A casing of Type A and of nominal size 5 shall be designated as:

Casing A5 IS: 7054

10. MARKING

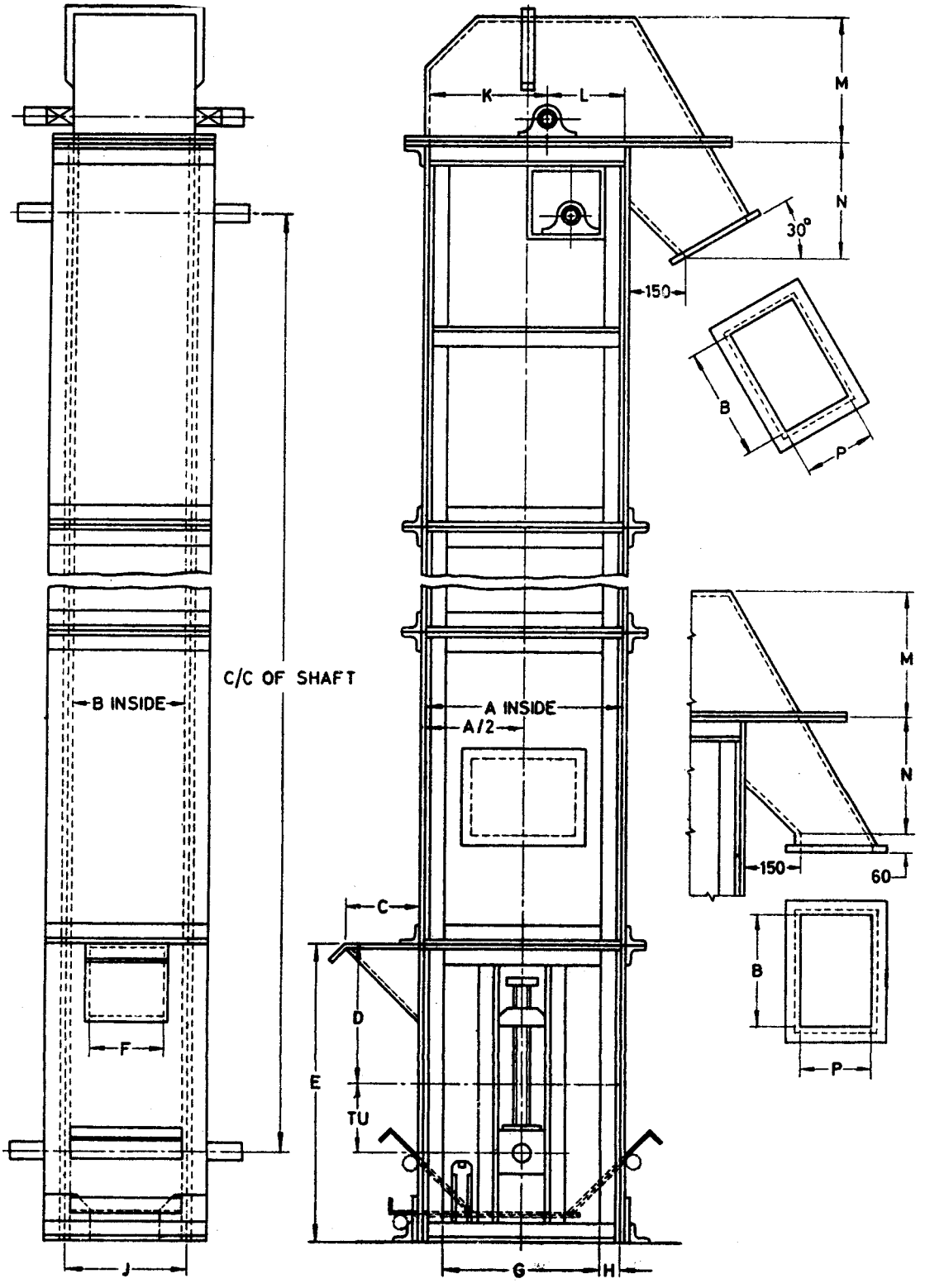
10.1 Different sections of the casing shall be match-marked to facilitate erection at the site.

10.2 The casing shall be marked with the following information on the name plate provided on the bucket elevator at the suitable prominent place(s):

a) Manufacturer's identification;
b) Type and nominal size of bucket elevator;
c) Capacity of bucket elevators, t/h; and
d) Any other information required by the purchaser.

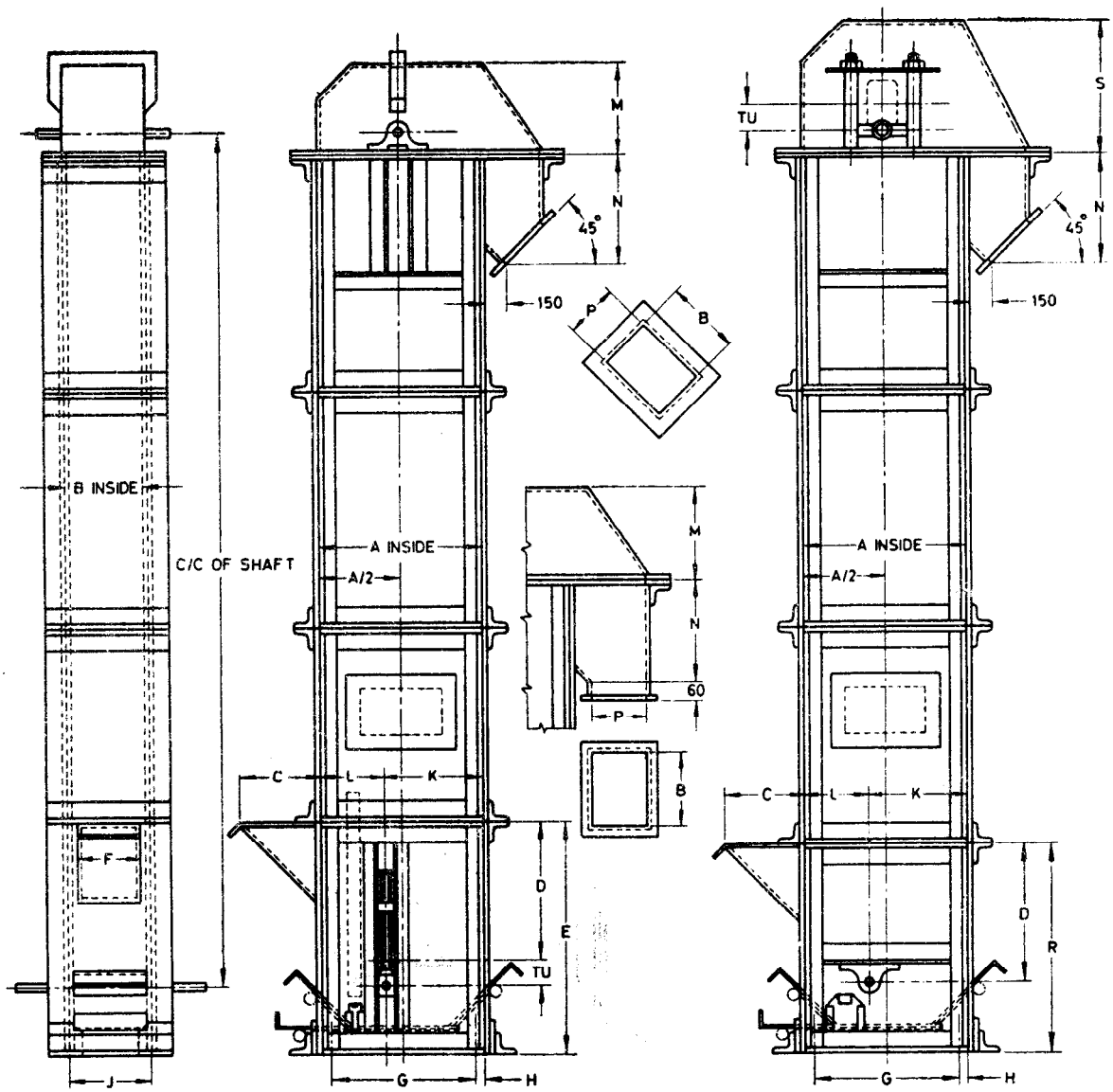
10.3 The casings may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution



All dimensions in millimetres.

FIG. 2 DIMENSIONS FOR CASING FOR POSITIVE DISCHARGE BUCKET ELEVATORS



All dimensions in millimetres.

FIG. 3 DIMENSIONS FOR CASING FOR CONTINUOUS BUCKET ELEVATORS FOR BUCKETS ON CHAINS AND/OR ON BELTS

(Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

11. PAINTING

11.1 The casing shall be painted from outside as may be agreed to between the purchaser and the supplier

12. PACKING

12.1 The casing shall be supplied loose or in packages as may be agreed to between the purchaser and the supplier.

TABLE 1 DIMENSIONS FOR CASING FOR CENTRIFUGAL DISCHARGE BUCKET ELEVATORS FOR BUCKETS ON CHAIN (TYPE A)

(*Clause* 4.1, and *Fig.* 1)

All dimensions in millimetres.

Nominal Size	Bucket Length*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*J*	*K*	*L*	*M*	*N*	*P*	*TU*	*R*	*S*
1	150	900	280	300	280	860	140	700	100	370	520	380	510	700	250	200	660	710
2	175	900	300	300	280	860	165	700	100	370	520	380	510	700	250	200	660	710
3	200	980	330	360	280	900	190	780	100	420	560	420	560	750	250	200	700	760
4	250	1 180	380	410	310	1 000	240	780	100	470	700	480	680	800	300	200	800	880
5	310	1 124	430	460	330	1 050	300	1 040	100	530	730	510	710	850	360	200	850	910
6	360	1 360	480	460	330	1 200	350	1 160	100	580	770	590	780	900	400	250	950	1 030
7	410	1 400	550	500	340	1 230	400	1 200	100	660	790	610	800	900	425	250	980	1 050
8	460	1 400	600	500	340	1 230	450	1 200	100	710	790	610	800	900	425	250	980	1 050
9	510	1 400	650	500	340	1 230	500	1 200	100	760	790	610	825	900	425	250	980	1 075
10	560	1 400	700	500	340	1 230	550	1 200	100	810	790	610	825	900	425	250	980	1 075
11	610†	1 400	750	500	340	1 230	600	1 200	100	860	790	610	850	900	425	250	980	1 100
12	610‡	1 500	750	610	360	1 300	600	1 300	100	860	840	660	900	950	500	250	1 050	1 150
13	800†	1 400	950	500	340	1 230	780	1 200	100	1 060	790	610	850	900	425	250	980	1 100
14	800‡	1 500	950	610	360	1 300	780	1 300	100	1 060	840	660	900	950	500	250	1 050	1 150
15	1 000	1 500	1 150	610	360	1 300	980	1 300	100	1 260	840	660	900	950	500	250	1 050	1 150

*Refer IS : 6833-1973 'Specification for buckets for bucket elevators'.

†For bucket projection up to and including 200 mm.

‡For bucket projection above 200 mm.

TABLE 2 DIMENSIONS FOR CASING FOR CENTRIFUGAL DISCHARGE BUCKET ELEVATORS FOR BUCKETS ON BELTS (TYPE B)

(*Clause* 4.1, and *Fig.* 1)

All dimensions in millimetres.

Nominal Size	Bucket Length*	*B*	*C*	*D*	*F*	*H*	*J*	*N*	*P*
1	150	400	300	280	140	100	490	700	250
2	175	400	300	280	140	100	490	700	250
3	200	400	360	280	190	100	490	750	250
4	250	400	410	310	240	100	490	800	300
5	310	500	460	330	300	100	600	850	360
6	360	500	460	330	350	100	600	900	400
7	410	600	500	340	400	100	710	900	425
8	460	600	500	340	450	100	710	900	425
9	510	750	500	340	500	100	860	900	425
10	560	750	500	340	550	100	860	900	425
11	610†	950	500	340	600	100	1 060	900	425
12	610‡	950	610	360	600	100	1 060	950	500
13	800†	1 150	500	340	780	100	1 260	900	425
14	800‡	1 150	610	360	780	100	1 260	950	500
15	1 000	1 400	610	360	980	100	1 510	950	500

Dimensions *A*, *E*, *G*, *K*, *L*, *M*, *R*, and *S* shall be calculated as given below after selecting pulley diameters which will depend on number of plies used [*see* IS : 1891 (Part I) - 1968 'Specification for rubber conveyor and elevator belting: Part I General purpose belting (*first revision*)']:

A = Head pulley diameter $+2$ (bucket projection) $+2$ (belt thickness§) $+2$ (front clearance‖).

$E = D + TU + 0{\cdot}5$ (boot pulley diameter) + belt thickness§ + bucket projection + bottom clearance‖

$G = A - 2H$

$K = 0{\cdot}5\,A + a$

$L = 0{\cdot}5\,A - a$

where $a = \dfrac{\text{Head pulley diameter} - \text{boot pulley diameter}}{2}$

$M = 0{\cdot}5\,A$ + Height of centre of shaft from bottom of bearing housing

$R = E - TU$

$S = E + TU$

TU shall be equal to one percent of centre-to-centre distance of shaft or 200 mm, whichever is higher.

*Refer IS : 6833-1973 'Specification for buckets for bucket elevators'.

†Dimensions given are for bucket projection up to and including 200 mm.

‡Dimensions given are for bucket projection above 200 mm.

§Refer manufacturer's catalogue.

‖Front and bottom clearances will depend upon the lump size and shall be 100 mm, *Min.*

TABLE 3 DIMENSIONS FOR CASING FOR POSITIVE DISCHARGE BUCKETS ELEVATOR (TYPE C)

(*Clause* 4.1, and *Fig.* 2)

All dimensions in millimetres.

Nominal Size	Bucket Lengths*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*J*	*K*	*L*	*M*	*N*	*P*	*TU*
1	150	700	520	300	280	850	140	500	100	610	450	250	560	750	330	200
2	175	700	520	300	280	850	165	500	100	610	450	250	560	750	330	200
3	200	800	570	360	280	850	190	600	100	660	500	300	560	750	330	200
4	250	800	620	400	310	900	240	600	100	710	500	300	560	750	330	200
5	310	850	670	460	330	850	300	650	100	770	525	325	560	750	330	200
6	360	1 070	770	460	330	1 120	350	870	100	870	610	460	720	920	430	250
7	410	1 070	830	500	340	1 140	400	870	100	940	610	460	720	920	430	250
8	460	1 070	830	500	340	1 140	450	870	100	990	610	460	720	920	430	250
9	510	1 070	930	500	340	1 140	500	870	100	1 040	610	460	720	920	430	250
10	560	1 070	1 000	500	340	1 140	550	870	100	1 110	610	460	720	920	430	250
11	610	1 150	1 050	610	360	1 200	600	950	100	1 160	650	500	750	920	550	250
12	800	1 150	1 280	610	360	1 200	780	950	100	1 390	650	500	750	920	550	250
13	1 000	1 150	1 480	610	360	1 200	980	950	100	1 590	650	500	750	920	550	250

*Refer IS : 6833-1973 'Specification for buckets for bucket elevators.'

TABLE 4 DIMENSIONS FOR CASING FOR CONTINUOUS BUCKET ELEVATORS FOR BUCKETS ON CHAIN (TYPE D)

(*Clause* 4.1, and *Fig.* 3)

All dimensions in millimetres.

Nominal Size	Bucket Length*	Bucket Projection*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*J*	*K*	*L*	*M*	*N*	*P*	*TU*	*R*	*S*
1	150	75	850	250	250	870	1 450	100	650	100	340	495	355	500	650	250	200	1 250	700
2	200	125	1 000	300	350	870	1 500	150	800	100	390	570	430	575	740	250	200	1 300	775
3	250	150	1 000	330	400	1 150	1 800	200	800	100	450	570	430	575	740	250	200	1 600	940
4	250	180	1 220	350	460	1 150	1 870	200	1 020	100	450	705	515	700	840	380	200	1 670	1 040
5	310	180	1 220	410	460	1 150	1 870	260	1 020	100	510	705	515	700	840	380	200	1 670	1 040
6	310	200	1 220	410	500	1 150	1 890	260	1 020	100	510	705	515	700	840	380	200	1 690	1 040
7	360	180	1 220	460	460	1 200	1 920	310	1 020	100	560	705	515	700	840	380	200	1 720	1 040
8	360	200	1 220	460	500	1 200	1 940	310	1 020	100	570	705	515	700	840	380	200	1 740	1 040
9	410	200	1 220	510	500	1 200	1 940	360	1 020	100	620	705	515	700	840	450	200	1 740	1 040
10	460	200	1 220	560	500	1 200	1 940	410	1 020	100	670	705	515	700	840	450	200	1 740	1 040
11	460	300	1 450	560	700	1 250	2 140	410	1 020	100	670	820	630	800	900	450	250	1 890	1 150
12	510	250	1 450	610	600	1 250	2 090	460	1 250	100	720	870	580	800	900	450	250	1 840	1 150
13	510	300	1 550	610	700	1 250	2 140	460	1 350	100	720	920	630	800	900	450	250	1 890	1 150
14	610	250	1 450	710	600	1 250	2 090	560	1 250	100	820	870	580	800	900	450	250	1 840	1 150
15	610	300	1 550	710	700	1 250	2 140	560	1 350	100	820	920	630	800	900	450	250	1 890	1 150

*Refer IS: 6833 - 1973 'Specification for buckets for bucket elevators'.

TABLE 5 DIMENSIONS FOR CASING FOR CONTINUOUS BUCKET ELEVATORS FOR BUCKETS ON BELT (TYPE E)

(*Clause* 4.1, and *Fig.* 3)

All dimensions in millimetres.

Nominal Size	Bucket Length*	Bucket Projection*	*B*	*C*	*D*	*F*	*H*	*J*	*N*	*P*
1	150	75	400	250	870	100	100	490	650	250
2	200	125	400	350	870	150	100	490	740	250
3	250	150	400	400	1 150	200	100	490	740	250
4	250	180	400	460	1 150	200	100	490	840	380
5	310	180	500	460	1 150	260	100	600	840	380
6	310	200	500	500	1 150	260	100	600	840	380
7	360	180	500	460	1 200	310	100	600	840	380
8	360	200	500	500	1 200	310	100	600	840	380
9	410	200	600	500	1 200	360	100	710	840	450
10	460	200	600	500	1 200	410	100	710	840	450
11	460	300	600	700	1 250	410	100	710	900	450
12	510	250	750	600	1 250	460	100	860	900	450
13	510	300	750	700	1 250	460	100	860	900	450
14	610	250	950	600	1 250	560	100	1 060	900	450
15	610	300	950	700	1 250	560	100	1 060	900	450

Dimensions *A*, *E*, *G*, *K*, *L*, *M*, *R*, and *S* shall be calculated as given below after selecting pulley diameters which will depend on number of plies used [*see* IS : 1891 (Part I)-1968 'Specification for rubber conveyor and elevator belting: Part I General purpose belting (*first revision*)']:

A = Head pulley diameter +2 (bucket projection) +2 (belt thickness†) +2 (front clearance‡).

E = *D*+*TU*+0·5 (boot pulley diameter) + belt thickness† + bucket projection + bottom clearance.‡

$G = A - 2H$

$K = 0{\cdot}5\,A + a$

$L = 0{\cdot}5\,A - a$

where $a = \frac{\text{Head pulley diameter} - \text{boot pulley diameter}}{2}$

M = 0·5 *A*+height of centre of shaft from the bottom of bearing housing.

$R = E - TU$

$S = M + TU$

TU shall be equal to one percent of centre-to-centre distance of shaft or 200 mm, whichever is higher.

*Refer IS : 6833-1973 'Specification for buckets for bucket elevators'.

†Refer manufacturer's catalogue.

‡Front and bottom clearances will depend upon the lump size used and shall be 100 mm, *Min.*

Reprography Unit, BIS, New Delhi, India